

MATERNAL DEATH RISK FACTORS, CAUSES, AND ASSOCIATED CONDITIONS

Risk Factors

Race as a Risk Factor

The risk of pregnancy-related mortality varies greatly by race. Although most of the maternal deaths in Los Angeles during 1994-96 were to Hispanics (52.4%), most of the births during the same years were also to Hispanics (61.3%). The number of black maternal deaths was smaller than the number of Hispanic maternal deaths; black women, however, had the highest maternal mortality ratios of any racial group. The maternal mortality ratio (MMR) is the number of pregnancy-related deaths per 100,000 live births. An earlier study of Los Angeles County maternal deaths found the observed risk of maternal mortality was three times greater for blacks than for whites for the years 1986-1989 (5). In this FIMR Project review, the observed risk was nearly five times greater for blacks than for whites. This is similar to the pattern found by national studies (6).

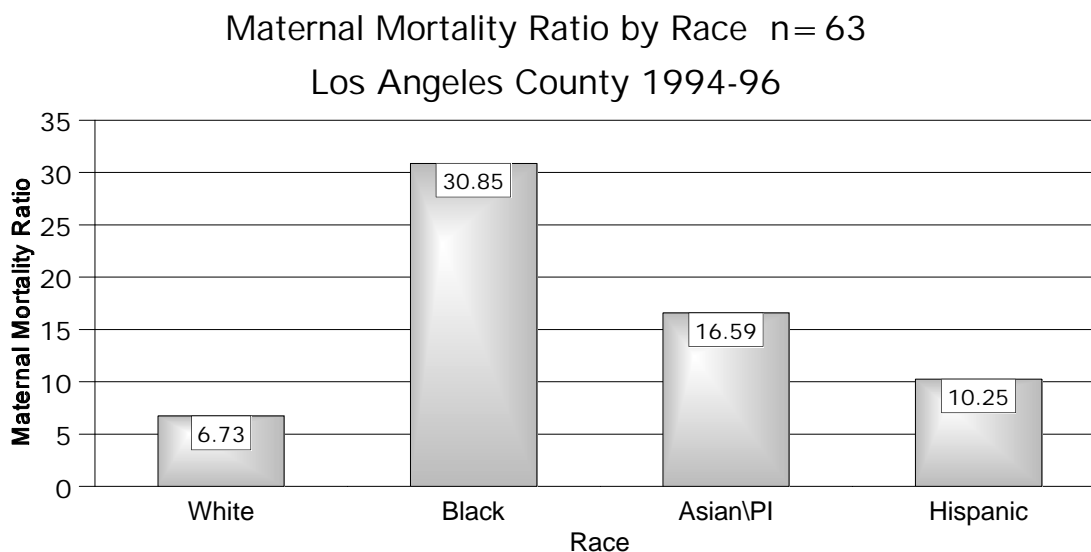


Figure 18 (see Table 18 in Appendix 4)

Age as a Risk Factor

It is well documented that the risk of maternal death increases sharply after age thirty, and even more strikingly after age forty (5,6). In the FIMR Project review, nearly two thirds of all maternal mortality cases were found in women over 35 years of age. The maternal mortality ratio (MMR) for women under age 30 was 7.7. For the 30-34 age group, the MMR more than doubled to 16.4 and increase to 19.5 for the 35-39 year age group. The highest risk of all was in the forty and older group, 53.7 MMR.

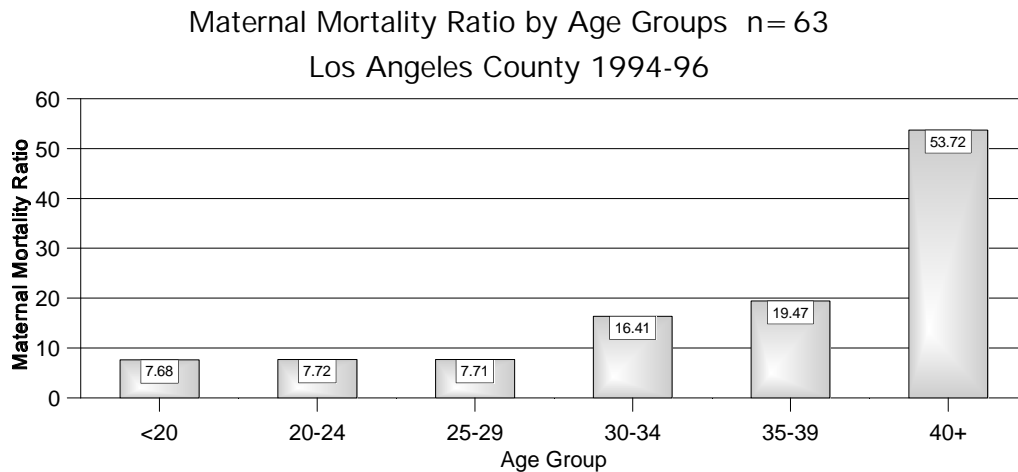


Figure 19 (see Table 19 in Appendix 4)

Comparison of the observed risk by age group for Los Angeles County 1994 and USA 1987-90 shows a very similar pattern of increased risk with age.

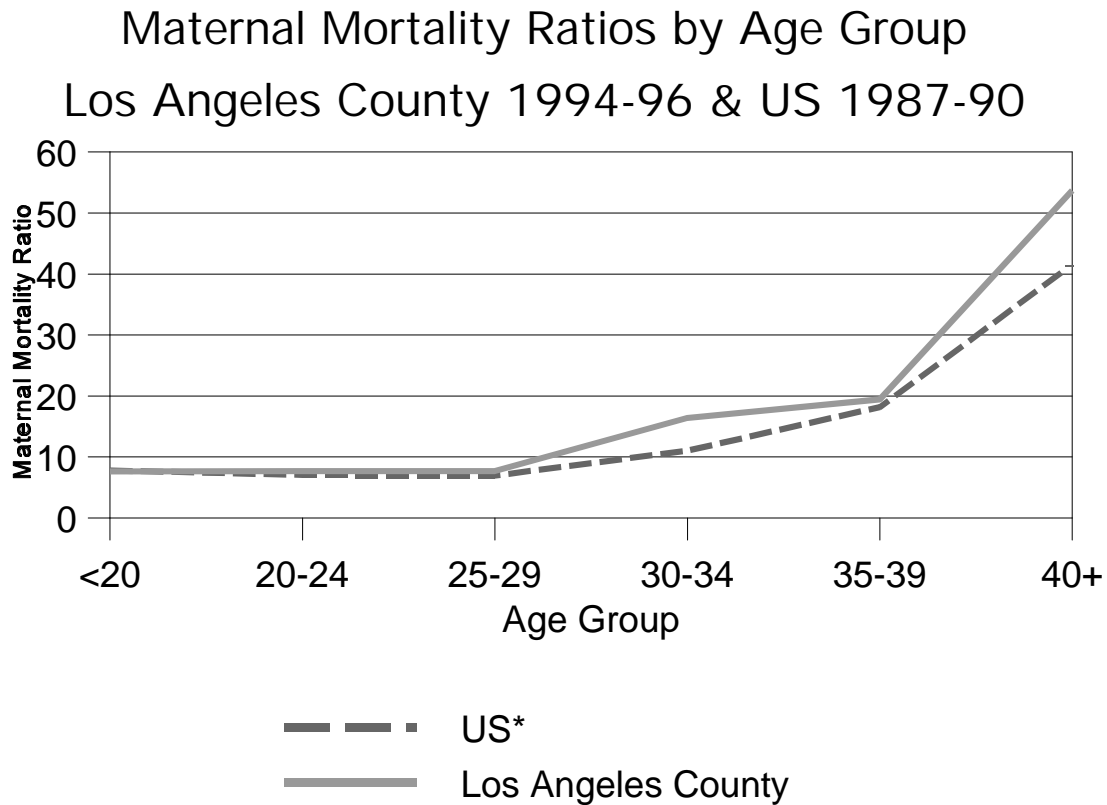


Figure 20 (see Table 20 in Appendix 4)

*US Data from MMWR 46:SS-4, 8/8/97

Live Birth Order as a Risk Factor

In previous studies, the risk of maternal death has been found to increase with live birth order, independent of maternal age (6). This is the number of times a woman has had a live birth, including the pregnancy associated with the maternal death. We compared live birth order of the women who had a pregnancy-related death to live birth order of all women who had a live birth in Los Angeles County during 1994-96. The number of maternal deaths was too small in our data to control for age but our data generally followed the national pattern of increased observed risk with increasing live birth order.

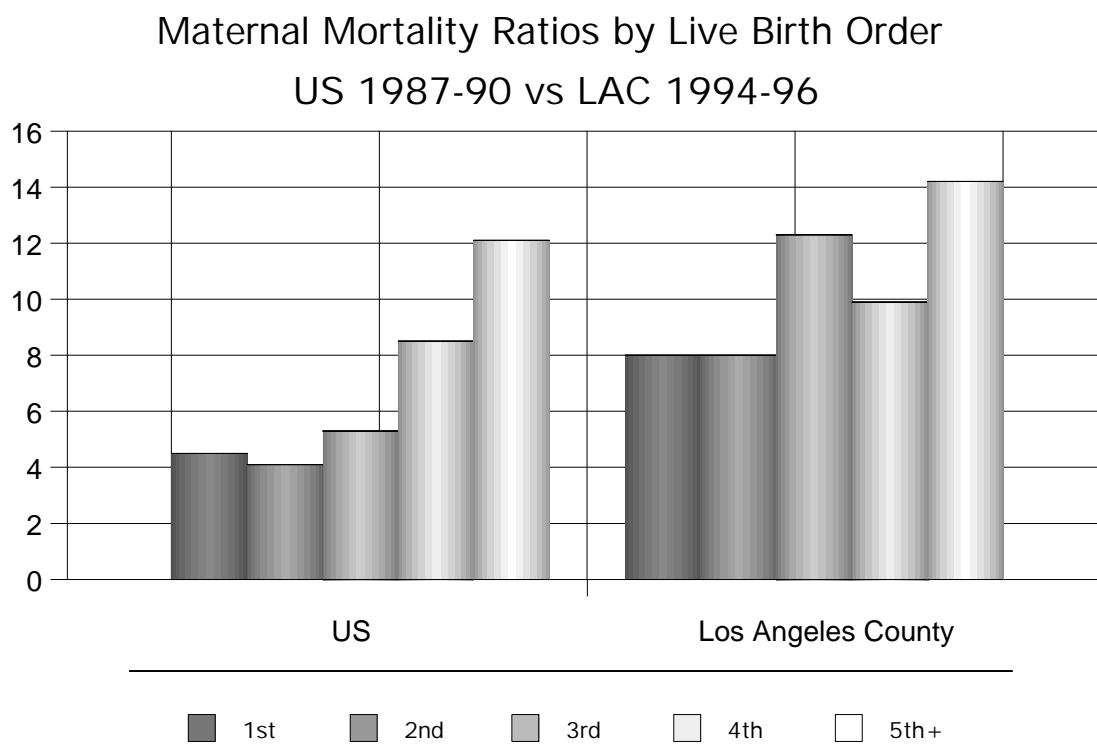


Figure 21 (see Table 21 in Appendix 4)

First Trimester Prenatal Care

The Year 2000 objective for early prenatal care is for 90% of pregnant women to enter prenatal care in the first trimester (1). Overall, 78.13% of women who gave birth in Los Angeles during this time period began care in the first trimester (1). Of those mothers who died after the first trimester, only 48.3% began care in the first trimester.

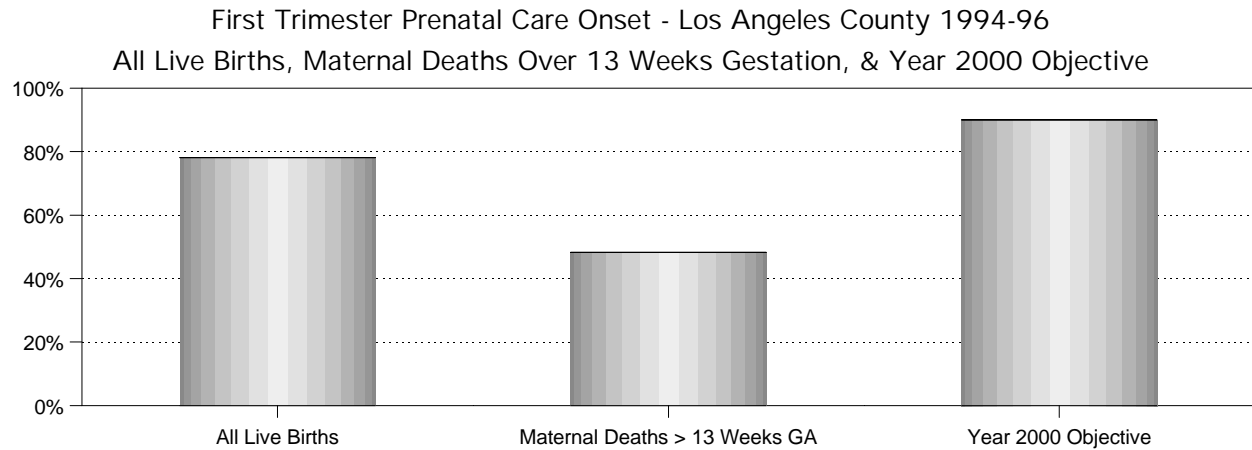


Figure 22 (see Table 22 in Appendix 4)

Adequacy of Prenatal Care

The Kessner Index, (8) measures the adequacy of prenatal care by the onset of care, the total number of visits and the length of the pregnancy, giving ratings of either adequate, intermediate or inadequate care levels. FIMR Project maternal death cases who died after the first trimester (13 weeks gestation) during 1994-96 were compared to all residents who had a live birth during the same period. There was a large difference in the percentage of adequate care between the women who died (37.9%) and all women who had a live birth (75.9%). In our review, five women had care that was found to be inadequate by the Kessner Index. Of these five women, four had no prenatal care. The Kessner Index is not a measure of the quality of the content of prenatal care.

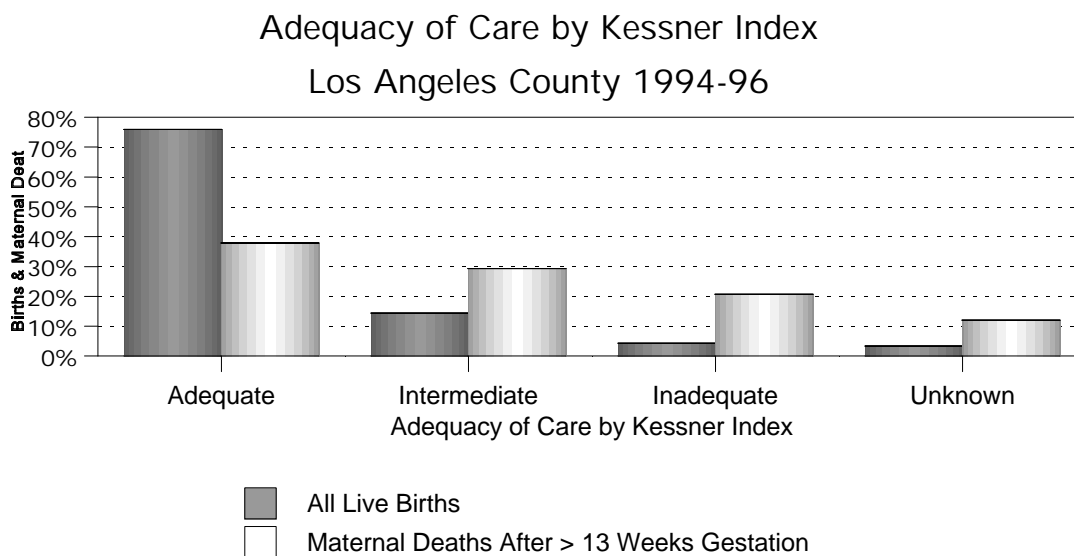


Figure 23 (see Table 23 in Appendix 4)

Prenatal Care and Substance Use

Lack of prenatal care is often cited as a risk factor for adverse perinatal outcomes, including maternal deaths. For the 52 women whose pregnancy outcome was either a live birth (45) or a stillbirth (7), the study compared the substance use (drugs, alcohol, and tobacco) of women who had no prenatal care to those to had at least one prenatal visit. The results were notable. There were 7 women (13.5%) who had no prenatal care. Of those 7 women, 5 (71.4%) used street drugs, alcohol, and/or tobacco; four of the five used street drugs, including cocaine, heroin, methamphetamine or used several street drugs.

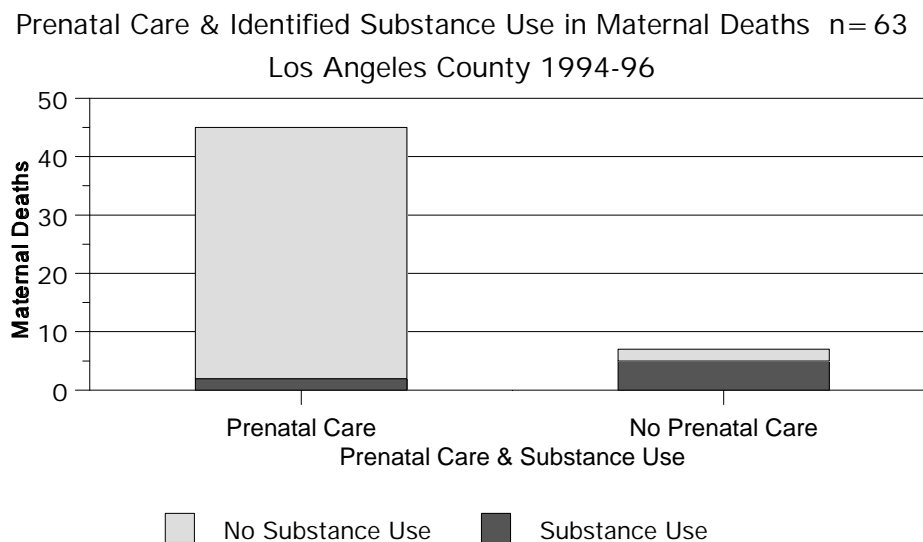


Figure 24 (see Table 24 in Appendix 4)

Note: Includes only cases where the pregnancy reached 20 weeks gestation, i.e., all live births and stillbirths.

Causes of Maternal Death

Primary Causes

The most common cause of pregnancy-related deaths was hemorrhage . There were 18 cases of hemorrhage (28.6%), 12 of embolism (19%), 11 of hypertension (17.5%), and 8 of infection (12.7%). There were no notable differences in cause of maternal death by race. Because hypertension is more common in blacks, we compared the percentage of deaths due to hypertension by race. There was no notable difference between blacks and other races.

Primary Causes of Maternal Deaths n= 63
Los Angeles County 1994-96

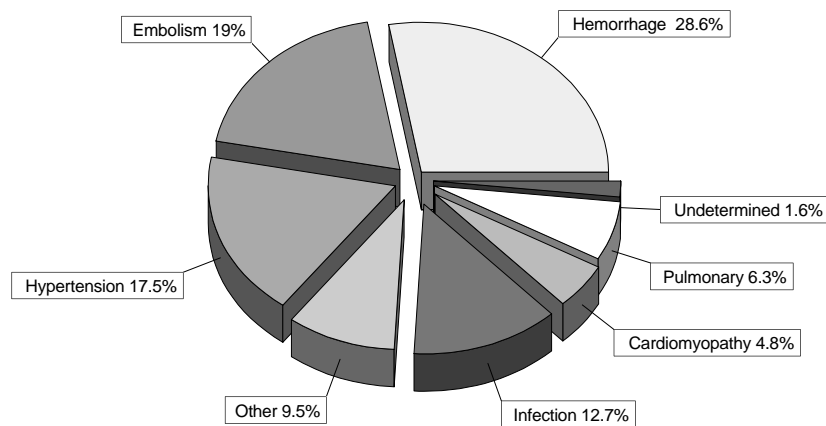


Figure 25 (see Table 25 in Appendix 4)

Hemorrhagic Causes of Death

Obstetric hemorrhage was the cause of maternal death in 18 of the 63 reviewed cases (28.6%). The most common causes of the hemorrhage were: uterine laceration/rupture, placenta accreta, abruptio placentae and ruptured ectopic pregnancy.

All of the women who died of hemorrhage due to placenta accreta had a current placenta previa and previous cesarean section(s). Previous cesarean sections and current placenta previa is known to increase the risk of placenta accreta. Deliveries in these 4 cases were by repeat cesarean sections, and 3 were followed by hysterectomies. Two of the pregnancies involved twin gestations.

A common element in the other hemorrhagic causes of death was provider mismanagement. Of the 5 uterine lacerations or ruptures: one was associated with placenta previa and the spontaneous rupture of a previous cesarean scar; two were iatrogenic; one was related to prolonged labor and a delayed cesarean; and one was caused by tetanic contractions from oxytocin. All 5 resulted in hysterectomies and 2 involved disseminated intravascular coagulopathy (DIC) as an associated condition.

**Hemorrhagic Causes of 18 Maternal Deaths
Los Angeles County 1994-96**

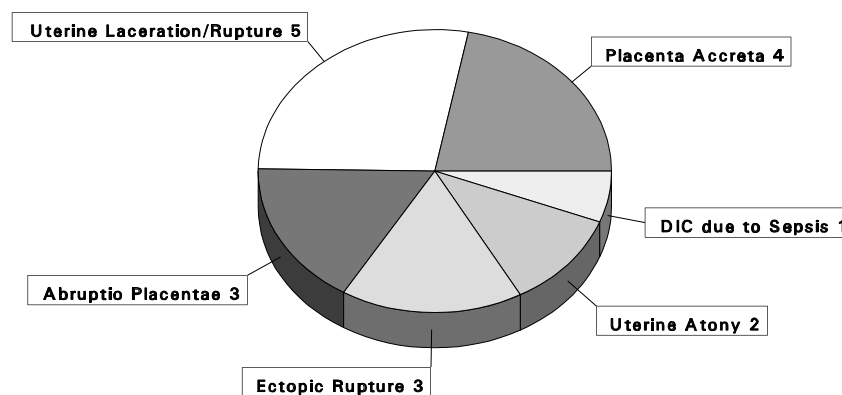


Figure 26 (see Table 26 in Appendix 4)

Associated Conditions Leading to Maternal Death

Each maternal death was coded for associated conditions leading to maternal death in addition to the primary cause of death, based on the findings of the panel. The coding system was adapted from the National Pregnancy Mortality Surveillance Coding Manual, developed by the Centers for Disease Control and Prevention. The following conditions were found to be associated with the maternal deaths:

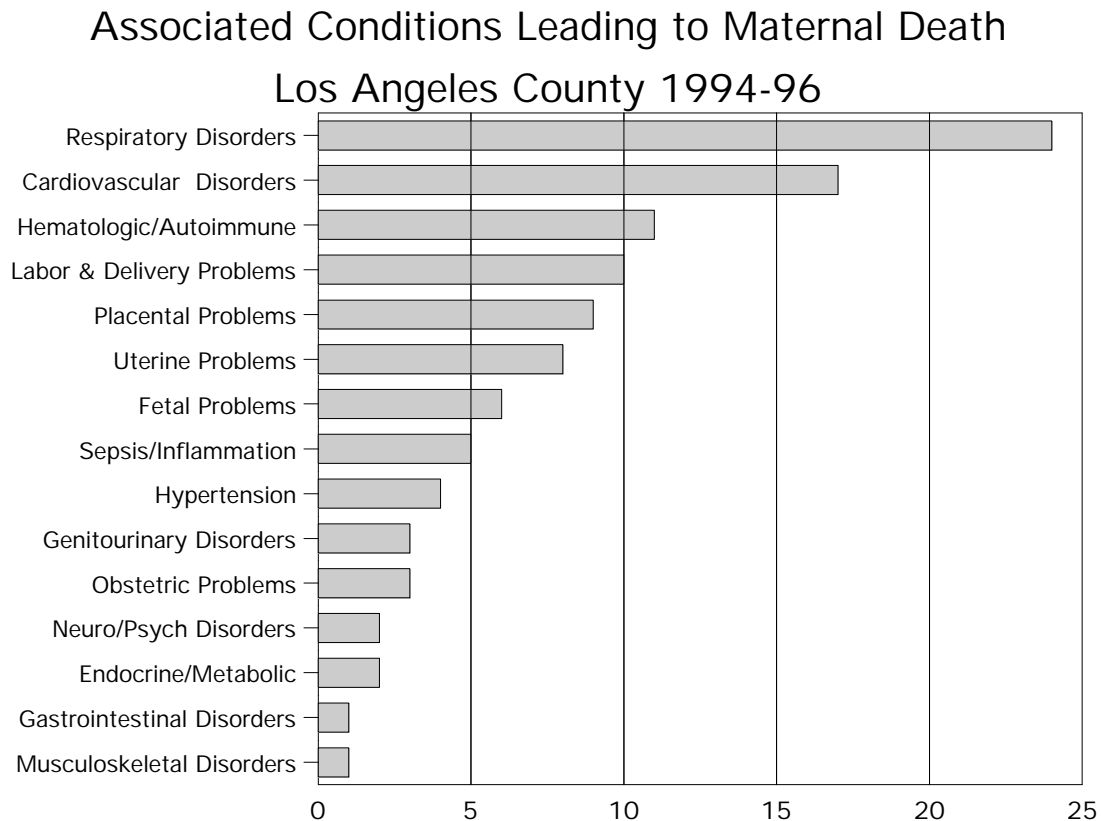


Figure 27 (see Table 27 in Appendix 4)